

DISEASE SEVERITY MODELED ON TWO ORDINAL INDICES IN A PROSPECTIVE STUDY OF VULVOVAGINAL CANDIDIASIS AMONG WOMEN WITH OR AT INCREASED RISK FOR HIV

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Objectives: To model the severity of vulvovaginal candidiasis (VVC) using two ordinal indices, and to quantify the association of human immunodeficiency virus (HIV) serostatus with each combination of index levels.

Methods: The first index, yeast growth, was classified into four ordered categories based on Candida culture and amount of yeast on Gram stain. The second index was the number of clinical manifestations (vulvovaginal edema, erythema, and discharge). The Cartesian product of these two indices yielded 16 bivariate categories. Each bivariate category also determined an upward-inclusive category constructed from that category together with other categories at or above the same levels of yeast growth and clinical signs. Poisson regression yielded 15 HIV prevalence ratio estimates for each upward-inclusive category, adjusted for within-subject correlation. Additional models estimated prevalence of each upward-inclusive category conditional on lower levels of severity. Sensitivity analyses assessed the robustness of models against distribution choice and link function, confounding, and effect modification.

The data were from the HIV Epidemiology Research Study, a prospective cohort of 871 HIV-infected and 439 high-risk, uninfected women from four US cities.

Results: Compared to uninfected women, HIV-infected women exhibited any yeast growth 44% more often ($p < 0.001$) and at least one sign 14% more often ($p < 0.001$). Vulvovaginal candidiasis (VVC)—defined as the presence of yeast organism and at least one of three clinical signs—occurred 77% more often in women infected with HIV ($p < 0.001$). Among women with some yeast growth, there was no difference by HIV status in prevalence of additional signs. Similarly, among women with at least one sign, there was no difference by HIV status in prevalence of additional signs. Results did not differ appreciably in binomial models with logit link, and there was no evidence of confounding or effect modification.

Conclusion: HIV infection is associated with increased occurrence of all levels of yeast growth, any number of clinical signs, and combined levels of these indices. However, among women with VVC, there is no difference by HIV status in severity of candidiasis as measured by these indices.